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Personalization, authentication and self-disclosure in self-administered Internet surveys

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Abstract

Two studies are presented that examine disclosure of sensitive information and personalization in Internet-based surveys. In the first study, the impact of a personalized salutation on two forms of non-disclosure to a sensitive personal question (salary level) is tested. The results revealed that a personalized salutation tends to increase levels of active non-disclosure (measured through use of an 'I prefer not to answer' option), but not passive non-disclosure (where the respondent selects no option). In the second study, participants are directed to the study via either a personalized URL (which incorporated an encoded identifier not obvious as such to the responder) or via a secure log-on page that required the user to type in identifying information. Non-disclosure to a sensitive question (salary) was significantly higher when participants went through a log-on procedure. We suggest that this pattern of non-disclosure to sensitive questions reflects increases in identifiability when a personalized salutation or log-on procedure is used. We further suggest that the provision of an active non-disclosure option to a sensitive question is particularly appropriate in contexts in which anonymity may be compromised, since it enables participants to both protect their privacy and respond appropriately to the survey.

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1. Introduction

Surveys and research administered via the Internet, rather than using paper methodologies, have been associated with reductions in socially desirable responding (Frick, Bächtiger, & Reips, 2001; Joinson, 1999), higher levels of self-disclosure (Weisband & Kiesler, 1986) and an increased willingness to answer sensitive questions (see Tourangeau, 2004). However, it is still unclear how this tendency varies with changes in the research context – for instance, the ordering of items, the location within a survey of specific items, and the format of the questions requesting sensitive personal information. There is some indicative evidence that manipulations that change the perceived vulnerability of the participant to repercussions arising from their disclosure (e.g., by changing the geographical distance between the participant and the computer receiving responses; Moon, 1998) also influence willingness to disclose sensitive information. Similarly, Joinson (1999) found that the removal of anonymity from a questionnaire led to increased socially desirable responding, independent of the mode of questionnaire administration (i.e., paper or Internet).

In a similar vein, survey methodology techniques that tend to reduce human involvement in question administration also increase responses to sensitive personal questions. For instance, compared to other research methods, when data collection is conducted via computer-aided self-interviews (where participants type their answers on to a laptop) people report more health related problems (Epstein, Barker, & Kroutil, 2001), more HIV-risk behaviours (De Jarlias et al., 1999), more drug use (Lessler, Caspar, Penne, & Barker, 2000), and men report less sexual partners, and women more (Tourangeau & Smith, 1996). Similarly, automated or computerized telephone interviews, compared to other forms of telephone interviewing, lead to higher levels of reporting of sensitive information (see Lau, Tsui, & Wang, 2003; Tourangeau, 2004).

At the same time as increasing the ability to automate survey administration, new technology has enabled researchers to experiment with ways in which the research interaction between participant and researcher can be personalized. This personalization can take a number of forms, including the use of researcher photographs, information about the researcher, the use of personal salutations and questions, or URLs designed specifically for the individual. According to social interface theory (e.g., Nass, Moon, & Green, 1997), even subtle cues (e.g., gender text, voice) in a computer interface will influence people's reactions to the computer. For instance, Walker, Sproull, and Subramani (1994) administered questionnaires to people using either a text display or talking-face displays to ask the questions. Those interacting with a talking face display spent more time, made fewer mistakes, and wrote more comments than people interacting with the text display. Similarly, Moon (2000) and Joinson (2001) present evidence that people reciprocate self-disclosure from the survey administrator (both information about the computer managing the survey and the researcher respectively).

Conversely, methods that increase the social presence of the surveyor (e.g., by using photographs of the researcher) have been predicted to lead to a reduced will-

ingness to answer sensitive questions (Tourangeau, Couper, & Steiger, 2003), although the findings of Tourangeau et al. were equivocal. However, Sproull, Subramani, Kiesler, Walker, and Waters (1996) found that participants "present themselves in a more positive light to the talking-face displays" (p. 116) than to text-only interfaces.

Joinson and Reips (2004) also report that, although personalized salutation led to significantly higher response rates, it should be used with caution when there is a possibility of face-saving biases or acquiescence on the part of participants. The rationale for this is because, they claim, personalization compromises anonymity.

Similarly, Andreasen (1970) notes that personalization of mail surveys may reduce response rates in certain circumstances (i.e., when sensitive information is requested) because anonymity is reduced or removed. In the present study, two forms of personalization are studied. The first is the use of a personalized salutation in an e-mail invitation to complete an Internet survey. In keeping with earlier work by Joinson and Reips (2004), the power of the survey sponsor is also manipulated to examine any interaction between power and salutation on disclosure to a sensitive question. It is predicted that a personalized salutation will lead to reduced disclosure to a sensitive question. In the second study, the impact of a second form of personalization (individualized URL) is examined. Because this form of personalization reduces the perception of identifiability (compared to the use of a log-on page or personalized salutation), it is predicted that it will be associated with higher levels of disclosure to a sensitive question.

Unwillingness to disclose information when faced with a particular question in a survey can be measured in four main ways in Internet surveys, apart from using the randomized response technique (e.g., Musch, Bröder, & Klauer, 2001) or asking directly. The first is non-response – either submitting a default selection, or where there is no default option, submitting no response. The second and third – the breadth (word count) and depth (content analysis) of disclosure – are only really appropriate for free text entry. The fourth is to add an option that allows participants to select 'I prefer not to answer' (Buchanan, Joinson, & Tanck, 2002; Knapp & Kirk, 2003). The use of 'I prefer not to answer' as a response option to a sensitive question is methodologically similar to the provision of a 'no opinion' response in attitudinal surveys. While it has been argued that the provision of 'no opinion' choices may increase satisficing in attitude surveys (Holbrook, Green, & Krosnick, 2003), there is little reason to assume that a similar process would operate in the use of 'I prefer not to answer' responses to sensitive personal questions. Indeed, Reips and Joinson (in preparation) report that the provision of 'I prefer not to answer' options in a salary question may improve data quality by reducing the number of non-responses or default selections. In the present research, an 'I prefer not to answer' response was used to measure non-disclosure.

It is predicted that personalized salutation will be associated with increased use of a 'non-disclosure' option, and personalized URL associated with reduced use of the same option.

2. Study one

2.1. Method

2.1.1. Participants

Participants were 3544 members of an online student panel maintained by the first author. Members of the panel, called 'PRESTO', volunteered from a random sample of 20,000 Open University students with e-mail addresses. The UK Open University is a distance education institution with circa 200,000 adult students taking part-time courses. Members of the panel agree to receive up to six online surveys per annum, and were recruited in the Fall of 2002 and Summer of 2003. The panel comprises 1619 (46.2%) men and 1884 (53.7%) women The mean age for panel members is 41.8 years (SD = 10.4). Gender and age data is missing for 41 members of the panel.

The panel was randomly divided into four equal sub-groups (886 per group) and each group assigned a condition using a 2×2 design (power of sender (high vs. neutral) $\times$ salutation (personalized vs. impersonal)).

2.1.2. Materials and procedure

In keeping with previous studies (e.g., Joinson & Reips, 2004), salutation was manipulated in the e-mail that invited panel members to complete the survey. Panel members were assigned to one of two salutation conditions ('Dear PRESTO panel member' and 'Dear <forename>'). Power was manipulated by the presence or absence of the professorial title and rank of the sponsor of the survey in the first and final lines of the e-mail. In the neutral power condition, the source of the e-mail was: ''From <name> (Strategy, Planning and Partnerships), The Open University''. In the high power, the source was shown as ''From Professor <name>, Pro-vice chancellor (Strategy, Planning and Partnerships), The Open University''. The e-mail briefly described the topic of the survey (widening participation and social class), and provided a unique URL linking to the survey (this URL contained an encoded identifier for the panel member). The survey remained open for 14 days, the vast majority of survey responses to an e-mail invitation occur within nine days (Welker, 2001).

The survey contained 14 questions about participants' socio-economic status, perceived social class, their present job and their parents' occupations. The penultimate question asked participants to disclose their income. The response options were a series of income bands (e.g., 'No income', '£1–4999', '£5000–£9999'). The option ''I don't want to say'' was positioned first (i.e., top) in a list running downwards from low to high income. The salary bands were every £5000 until £30,000, and then every £10,000. The final salary band was '£100,000 or more per annum'. Response was through the use of a radio button placed to the right of each salary band. There was no default selection.

2.2. Results and discussion

The survey comprised a start page introducing the survey and a single 'HMTL' page containing the questions. In light of this, two measures of survey response rate

are possible – the number of people visiting the start page who clicked the 'continue' button, or those who completed and/or submitted the survey page.

1736 (49.0%) participants visited the start page and clicked 'continue', and 1617 (45.6%) submitted the second page (i.e., the questions). In the present study we take the more conservative latter group for measures of response rate.

Drop out during the survey was low: 119 (6.9%) of the panel members who began the questionnaire (i.e., clicked 'continue' on the start page) did not complete it. There were no differences in drop out across conditions (χ^2 all $ps > .10$).

2.2.1. Power, salutation and response rates

The cross tabulations of power and salutation with response rates are presented in Table 1 (response measure = submission of final page of survey).

χ^2 Tests confirmed a significant association between power ($\chi^2 = 2.71$, df = 1, $p = .053$, odds ratio = 1.12) and response rate, but not salutation and response rate ($\chi^2 = 0.96$, df = 1, p = .17, ns, odds ratio = 1.07). In keeping with the results of Joinson and Reips (2004), the highest response rate was a personalized salutation combined with a high power requestor. Two further χ^2 tests were conducted to examine the effect of salutation across each level of power. When power was neutral, there was no association between salutation and response rates ($\chi^2 = 0.01$, df = 1, $p > .9$, odds ratio = 0.99). When power was high, there was a marginally significant effect of salutation ($\chi^2 = 2.18$, df = 1, $p = .077$, odds ratio = 1.15).

2.2.2. Personalized salutation and self-disclosure of salary

Two measures of non-disclosure are possible in the present study. The first is active non-disclosure – the selection and submission of 'I prefer not to answer' in response to the salary question. The second is non-selection of any option (there was no default choice). The number and percentage of panel members in the personalized and non-personalized conditions who non-disclose using each method is shown in Table 2.

There was a marginally significant association between salutation ($\chi^2 = 4.47$, df = 2, $p = 0.10$) and non-disclosure. Specifically, the tendency is for use of an 'I prefer not to answer' option to be more heavily employed when a personalized salutation is used to address panel members, and for submission of no response to be higher when an impersonal salutation is used. There was no association between power and non-disclosure ($\chi^2 = 0.44$, df = 2, $p = 0.97$, ns).

Thus, there is some slight evidence that a personalized salutation leads to reduced disclosure to a sensitive personal question, in the form of selection of an 'I prefer not

Table 1
Power, salutation and response rates (raw and %)

	Dear John	Dear PRESTO panel member	Total
High power	432 (48.8)	401 (45.3)	833 (47.4)
Neutral power	391 (44.1)	393 (44.4)	784 (44.2)
Total	823 (46.5)	794 (44.9)	1617 (45.6)

Table 2
Personalized salutation and selection of 'I prefer not to answer' and submission of no selection (*n* and %)

	Disclosed salary	Chose 'I prefer not to say'	Submitted no selection	Total
Dear John	716 (87.0)	94 (11.4)	13 (1.6)	823
Dear Presto panel member	695 (87.5)	76 (9.6)	23 (2.9)	794
Total	1411 (87.3)	170 (10.5)	36 (2.2)	1617

to say' option, although the size of the effect was small and did not reach significance. Moreover, any increase in non-disclosure in the personalized salutation condition seems to be compensated through an increased tendency of participants in the non-personalized condition to submit no response. This pattern of responses might reflect the increased identifiability of participants in the personalized salutation condition, which may lead to an increased motivation to 'respond' well. However, simultaneously these same participants are faced with a potential threat to their privacy (a sensitive question), and thus face a dilemma. Protecting their privacy requires that they not answer the question, which in turn compromises their behavior as a 'good' respondent. A solution to the dilemma is to use the 'I prefer not to answer' option. For participants in the non-personalized salutation condition, the compliance (and possible sanction) pressure to respond well is reduced, and so survey respondents are more likely to simply submit no response.

The role of identifiability is examined in more detail in the second study where personalization is used to explicitly or implicitly authenticate participants.

3. Study two

3.1. Overview

In Study Two, two different methods of participant authentication are tested in relation to disclosure of salary. Members of the same student panel as described in Study One were either e-mailed a personalized URL in which their identifier was encrypted, or were sent a URL which required them to log-on using their student computer username and password via a secure server. It was predicted that disclosure of salary would be lower when participants went through the log-on procedure.

3.2. Method

3.2.1. Participants

Participants were 1144 members of a student panel sampled and described in Study One. The study was conducted 10 weeks after Study One. The sample comprised 633 women and 507 men (data missing for four participants), with a mean

age of 43.6 years (SD = 10.44). Five participants were removed from the initial data file because they submitted the survey without answering a single question.

3.2.2. Materials and procedure

In Study Two, panel participants completed a survey developed for the UK Government on part-time student costs and fees. The survey was developed by the authors of the present research. The survey comprised 16 questions (25 including sub-parts of questions). These included enquiries about the cost of the students' studies, their age and gender and number of dependents, and their own and their partners' income. The income questions were positioned towards the end of the survey (questions 13 and 14 for self and partner, respectively), and were answered using radio buttons (running vertically) linked to 20 salary bands ('zero' to '£35,000 and over'). The final option was 'I prefer not to answer'. Selection of this option formed the measure of non-disclosure. Although the number of bands, and placement of the 'prefer not to answer' option at the bottom of a long list, is not ideal, this was specified by the sponsors of the survey.

Panel members were e-mailed the invitation to complete the survey. The e-mail briefly described the topic of the survey, and asked participants to self-select participation based on a number of variables (they must be current students, UK-based, and not post-graduate students). Because of this self-selection, absolute measures of response rate are not possible in the present study.

Half of the panel (1775) was sent a unique URL with their identifier encoded in the link. The remaining half was sent to a URL that required them to log-on to access the survey. The log-on used was the official University access page to the Intranet – with an automatic redirect once a valid username and password was entered. The log-on page is hosted on a secure server, and the panel members would be familiar with both the log-on procedure and the automatic forwarding since the same method is used for access to the library, personal records and virtual campus.

The survey was kept open for 14 days, after which any participant accessing the URL would be directed to a page thanking them for their interest, but stating that the survey was now closed.

3.3. Results and discussion

The response rate was higher when participants were sent a personalized URL ($n = 618$) than in the authentication group ($n = 526$). However, given the self-selection of the participants based on criteria within the e-mail, comparisons of response rates for each condition should be made with caution.

3.3.1. Salary disclosure and authentication method

The number (and percentage) of people disclosing their salary, and those selecting the 'I prefer not to answer' option is shown in Table 3. Across both conditions, 22 participants did not select any option to the personal salary question (13 in the encoded URL condition, 9 in the log-on condition). However, of these 22, two answered only one question in the survey, and a further 10 answered only a few

Table 3
Disclosure and non-disclosure of salary (*n* and %) by authentication method

	Disclosed salary	'I prefer not to say'
Encoded URL	587 (97.0%)	18 (3.0%)
Log-on	488 (94.4%)	29 (5.6%)

of the questions. None of the participants skipped the salary question but answered all other questions. Given this pattern of responses, 'passive' non-disclosure is not analysed in the present study.

χ^2 Tests (Yates correction) confirmed a significant association between authentication method and disclosure or otherwise of personal salary ($\chi^2 = 4.18$, df = 1, $p = .041$, odds ratio = 1.94). Thus, using an explicit authentication method, as opposed to an encoded URL, was associated both with lower overall response rates, and a greater chance of those responding opting for 'I prefer not to answer' to a sensitive question.

As predicted, a personalized URL was associated with a greater willingness to answer a sensitive question. The response rate was also higher in the encoded URL group, although this could be due to a number of factors, including use of the self-selection criteria. However, given that the log-on authentication group required four steps to reach the survey (click link in e-mail; enter username and password; click proceed; select 'OK' to leave secure server), which included entering usernames and passwords (which not all may know off hand), it may be reasonable to ascribe some difference between the groups to the differing authentication method. Interestingly, given that the log-on group faced a relatively high hurdle just to reach the survey, one would expect that participants would be well motivated to complete the survey once there (Reips, 2002). However, despite the likely motivation-advantage of this group, they were still significantly more likely to select 'I prefer not to say' when asked a sensitive question.

4. General discussion

As predicted, in Study One the highest response rate to the survey was when a personalized invitation came from a high power source. This replicates work conducted by Joinson and Reips (2004), which also found a significant effect of personal salutation on response rates only when the power of the audience/requestor was high. In the present study, power was significantly associated with increased response rates, while salutation was not. However, the use of a personalized salutation increased the odds of a participant responding by nearly 15% when the power of the requestor was high, and had a less than 1% impact on the odds when the power of the requestor was low.

However, the primary aim of the present study was to examine any impact of personalized salutation and requestor power on willingness to disclose sensitive infor-

mation. In the present research, a personalized salutation led to higher levels of use of the 'I prefer not to answer' option, whereas a non-personalized salutation led to higher levels of non-selection of any option.

The pattern of results tends to support the hypothesis that personalization of survey requests may serve to reduce participants' perceptions of anonymity, which in turn may lead to reductions in response rates to sensitive questions (Andreasen, 1970). However, personalization, possibly through increased identifiability, also seems to increase participants' motivation to respond 'well' to the survey. Across the two salutation conditions, non-disclosure was fairly even, it was the strategy adopted for non-disclosure that differed. Since use of an 'I prefer not to answer' option increases data quality (because it allows the researcher to differentiate between a participant's wish to preserve their privacy and errors/laziness), we would argue that such options should be included whenever a participants' anonymity is compromised. However, we cannot be absolutely sure of the effectiveness of this strategy without examining the response behaviour of participants who are addressed with a personal salutation but who are not given an opt-out to sensitive questions. In these cases, potential survey respondents face a dilemma that may only be solved through either skipping a question all together, or, if a response is forced, by quitting the survey process.

Our view of the critical role of identifiability was strengthened in Study Two. In this study, personalization was used to reduce the perception of identifiability by the use of an encoded, personalized URL rather than a log-on page. In Study Two, the use of an encoded URL was associated with significantly lower use of the 'I prefer not to say' option.

Together, the two studies illustrate the importance of careful thought about the use of personalization techniques when surveying areas of potential sensitivity. Just as designs that make the experimenter more salient can have contradictory effects depending on the social rules activated (e.g., reciprocity or social presence), so different personalization techniques seem to have contradictory effects dependent upon whether indentifiability is made salient or not. In the first study, we would argue that personalization was also associated with increased identifiability, whereas in the second a similar technology was employed to reduce obvious cues to identifiability.

We argue that it may be that when participants feel less identifiable (i.e., when there is a group salutation), the motivation to both respond to the survey, and 'respond well' is reduced. Thus, in Study 1, the non-personalized group showed a greater tendency to submit the default 'no selection', and a reduced tendency to submit a 'I prefer not to answer' response. However, in the same study, when a personalized salutation is used (particularly when the power of the requestor was high), the pattern of results suggests that participants have competing desires to 'respond well' and to protect their privacy. The use of an 'I prefer not to answer' option legitimizes non-disclosure, and so enables participants to both 'respond well' and protect their privacy. For less identifiable participants, there may be less acquiescence motivation, and thus a reduced motivation to either respond to the survey, and if they do respond, to use an 'I prefer not to answer' option. To support this interpretation, further studies would need to be conducted in which both sensitive and non-sensitive questions have opt-out options.

This would allow researchers to differentiate between respondents' vigilance and attention to the task and their non-disclosure behavior. A further weakness of the present studies is that, since the surveys were for an external sponsor, no manipulation checks of identifiability were possible. Future research would ideally include a manipulation check, and possibly include participants' privacy concerns as a moderator.

Moreover, in the present study, participants had volunteered to receive surveys, increasing the likelihood that they will disclose regardless of experimental condition. Indeed, the level of non-disclosure (whether active or passive) was low in both studies. Certainly, further research is required to clarify the present results, particularly using questions or samples in which a higher proportion of people are likely to wish to non-disclose. Finally, in the present two studies, a single measure of disclosure was used. Although this too was due to constraints due to the survey sponsors, it does reduce the likelihood of finding a small effect. Future studies should be designed to use the same method for testing non-disclosure, but with a number of different sensitive questions (thus creating a non-disclosure score). This would not only reduce the likelihood of a Type II error, but would also increase the range of statistical tests available to the researchers.

5. Conclusion

The results of the present research replicate previous research on salutation, power and response rates. Further, it examines the impact of manipulations of power of survey sponsor and personalization on non-disclosure to sensitive questions in an Internet survey. The results suggest that a personalized salutation increases levels of active non-disclosure, but not passive non-disclosure. However, an impersonal salutation was associated with higher levels of passive non-disclosure. In the second study personalization, in the form of an individualized URL in which an encoded identifier was placed, was associated with lower non-disclosure compared to a standard page with a log-on. We suggest that this pattern of different strategies of non-disclosure to sensitive questions reflects the impact of the differing personalization techniques on participants' sense of identifiability. We further suggest that the provision of an active non-disclosure option to a sensitive question is particularly appropriate in contexts in which anonymity may be compromised, since it enables participants to both protect their privacy and respond appropriately to an online survey.

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